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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/600,655	06/23/2003	Young-Chol Lee	1293.1667	6144
21171	7590	10/15/2004	EXAMINER	
STAAS & HALSEY LLP SUITE 700 1201 NEW YORK AVENUE, N.W. WASHINGTON, DC 20005			KALIVODA, CHRISTOPHER M	
			ART UNIT	PAPER NUMBER
			2883	

DATE MAILED: 10/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/600,655

Applicant(s)

LEE, YOUNG-CHOL

Examiner

Christopher M. Kalivoda

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-44 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-44 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Response to Arguments*

1. Applicant's arguments with respect to claims 1-44 have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-4, 9-12, 15-17, 20, 24-29, 33, 34, 42 and 44 are rejected under 35 U.S.C. 102(e) as being anticipated by Kowarz et al., U.S. Patent 6,567,217. Regarding independent claims 1, 15 and 42, Kowarz et al. teaches an illumination optical system/image display apparatus to form an image (col 1, lines 6-10) comprising an illumination optical system (Fig 8, ref sign 70,72 and 74) which comprises a light source which emits light having different wavelengths (Fig 8, ref sign 70 where each corresponds to red, green and blue respectively) and a light separation/integration device (Fig 8, ref sign 100) which includes diffraction devices which are provided on incident sides of the light separation/integration device (Fig 8, ref sign 18), wherein the diffraction device diffracts the light to adjust an incident angle thereof to a

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predetermined range. There is also an image optical system, which modulates the light, incident from the illumination optical system (Fig 8, ref sign 16,18,95 and 96 ) to form an image and a projection optical system which projects the light reflected from the image optical system (Fig 8, ref sign 75). While the reference does not specifically state diffracting the light to adjust the light to a predetermined range, the grating structure as claimed is present in Kowarz and the device is capable of adjusting the light to an incident angle in a predetermined range (See In re Swinehart, 169 USPQ 226 (CCPA 1971); In re Schreiber, 44 USPQ2d 1429 (Fed. Cir. 1997)).

Regarding claims 2 and 16, the light separation/integration device is an x-cube (col 5, lines 53-56).

Regarding claims 3, 4 and 17, the diffraction device is a diffraction optical element (col 5, lines 2-18) or holographic optical element.

Regarding claims 9, 10 and 25, there is a relay lens unit, which is provided between the light source and the light separation/integration device (Fig 8, ref sign 72).

Regarding claims 11, 12, 28 and 29, an optical path separation device is provided between the light source and the light separation/integration device (Fig 8, ref sign 96).

Regarding claim 20, there is a panel, which modulates the light incident from the illumination optical system according to an image signal of the display apparatus to generate the image (col 3, lines 24-28).

Regarding claim 24, the projection optical system projects the image onto an external screen (col 5, lines 53-56) to the display apparatus.

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Regarding claim 26 and 27, there is a relay lens unit that is provided between the light separation/integration device and the projection optical system (Fig 8, ref sign 72).

Regarding claim 33, while the reference does not specifically state decreasing the incident angle of the light to deduce light loss, the grating structure as claimed is present in Kowarz and the device is capable of decreasing the incident angle (See *In re Swinehart*, 169 USPQ 226 (CCPA 1971); *In re Schreiber*, 44 USPQ2d 1429 (Fed. Cir. 1997)).

Regarding claim 34, the diffraction device is formed on the incident side of the light separation/integration device (Fig 8, ref sign 18).

Regarding claim 35, since there is a diffraction device (Fig 8, ref sign 18), it has power.

Regarding claim 44, the optical path separation device reflects light from the light source it is a polarization beam splitter (col 4, lines 33-35) and light is transmitted from the separation/integration device (Fig 8, ref sign 75).

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. Claims 5-8 and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kowarz et al., U.S. Patent 6,567,217 in view of Saccomanno, U.S. Patent Application Publication 2003/0025842. Regarding claims 5-8 and 18-19, Kowarz et al. teach the limitations of the claims as describes above. However, the reference is silent with respect to a light guide unit between the light source and light separation/integration device, which is an optical fiber.

Saccomanno teaches a guide unit between the light source and light separation/integration device, which is an optical fiber (Fig 4, ref sign 265).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Kowarz et al. to include the guide unit between the light source and light separation/integration device, which is an optical fiber of Saccomanno for the purpose of routing light from the source (para 0074, lines 1-4).

Regarding claim 21, Kowarz et al. teach the limitations of the claims as describes above. However, the reference is silent with respect to a glass road between which uniformizes intensity of the light between the light separation/integration device and a panel, an optical path separation device between the glass road and the panel and a collecting lens between the glass road and optical path separation device.

Saccomanno teaches a glass road which uniformizes light intensity (Fig 4, ref sign 305).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Kowarz et al. to include the glass road of

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Saccomanno between the light separation/integration device and panel for the purpose of providing a degree of homogenization as known in the art (para 0059, lines 9-10).

Regarding claims 22 and 23, the optical path separation device would be between the glass road and the panel and a collecting lens between the glass road and optical path separation device as describe above.

6. Claim 30, 40 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kowarz et al., U.S. Patent 6,567,217 in view of Saccomanno, U.S. Patent Application Publication 2003/0025842 and further in view of Ho et al., U.S Patent 6,512,502. Regarding claim 30, 40 and 41, Kowarz et al. in view of Saccomanno teach the limitations as described above. In addition, digital micromirrors can be used as well as liquid crystals (col 3, lines 24-28) and the optical path separation device is a PBS (col 4, lines 33-35).

However, the reference is silent with respect to the optical path separation device being a total internal reflection (TIR) prism.

Ho et al. teaches that polarization beam splitters can be replaced with TIR prisms (col 5, line 66 – col 6, line 2).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Kowarz et al. and use the TIR prisms of Ho et al. for the purpose of reducing costs (col 5, line 66-67).

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7. Claims 13, 14 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kowarz et al., U.S. Patent 6,567,217 in view of Ho et al., U.S. Patent 6,512,502. Regarding claims 13 and 14, Kowarz et al. teach the limitations of the claims as described above.

However, the reference is silent with respect to the optical path separation device being a total internal reflection (TIR) prism.

Ho et al. teaches that polarization beam splitters can be replaced with TIR prisms (col 5, line 66 – col 6, line 2).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Kowarz et al. and use the TIR prisms of Ho et al. for the purpose of reducing costs (col 5,, line 66-67).

8. Claims 32, 36-39 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kowarz et al., U.S. Patent 6,567,217. Kowarz et al. discloses the limitations of the claims as described above. In addition, the image system includes panels, which receive the separated lights respectively, and modulates the lights to generate an image (col 3, lines 24-28). However, the reference is silent with respect to the x-cube including a coating which transmits or reflects light according to the incident angle and adjusting the incident angle to reduce a light loss of the illumination optical system and the light incident on the light separation/integration device at an angle of minimum of 0 degrees and a maximum of 4-8 degrees.

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It is not inventive to discover the optimum or workable ranges by routine experimentation (see MPEP 2144.04; In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to adjust the incident angle to a minimum of 0 degrees and a maximum of 4-8 degrees for the purpose of reducing light loss.

### ***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent Application Publication 2004/0190573 describes an imaging system using multiple light sources an x-cube and light modulator but there is no diffraction grating.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher M. Kalivoda whose telephone number is (571) 272-2476. The examiner can normally be reached on Monday - Friday (8:30 - 5:00).

11. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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12. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Brian Healy  
Primary Examiner